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10/542,753

07/20/2005

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EXAMINER

CHOI, LING SIU

ART UNIT

PAPER NUMBER

1713

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|--|--|
| Office Action Summary | Application No. 10/542,753 | Applicant(s) YABUNOUCHI ET AL. | |
| | Examiner Ling-Siu Choi | Art Unit 1713 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
 4a) Of the above claim(s) 17-23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 July 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>4/19/06, 11/21/05</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Election/Restriction

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claims 1-16, drawn to a solid catalyst component [claims 1-14] and a catalyst [claims 15-16].

Group II, claims 17- 23, drawn to a method to produce a propylene-ethylene random copolymer and the propylene-ethylene random copolymer [claims 17-20]; and a method to produce a propylene-ethylene block copolymer and the propylene-ethylene block copolymer [claims 21-23],

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: these two groups relates to a non-related products: a solid catalyst component/a catalyst and the propylene-ethylene random copolymer/the propylene-ethylene block copolymer.

2. During a telephone conversation with Mr. Roger W. Parkhurst on April 20/ 2007, a provisional election was made with traverse to prosecute the invention of Group I, claims 1-16. Affirmation of this election must be made by applicant in replying to this Office action. Claims 17-23 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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3. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 112

4. **The following is a quotation of the second paragraph of 35 U.S.C. 112:**

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4, lines 2-3, the recitation "the halogen-containing silicon compound (iii) is carbon tetrachloride" causes indefiniteness because carbon tetrachloride is not a silicon compound. Accordingly, the claim 4 has not been further treated on the merits.

Claim Analysis

6. Summary of claim 1:

| | |
|---|--|
| A solid catalyst component for olefin polymerization obtained by reacting the following compounds (i), (ii) and (iv); or (i), (ii), (iii) and (iv): | |
| i | a halogen-containing titanium compound; |
| ii | an alkoxy-containing magnesium compound obtained by reacting metal magnesium, an alcohol and a halogen and/or a halogen-containing compound containing at least 0.0001 gram atom of halogen atoms per mol of the metal magnesium; |
| iii | a halogen-containing silicon compound; and |
| iv | an electron-donating compound represented by the following general formula (I): $\begin{array}{c} \text{R}^1 \\ \\ \text{R}^2-\text{O}-\text{C}-\text{C}-\text{C}-\text{O}-\text{R}^3 \\ \quad \quad \\ \text{O} \quad \text{H} \quad \text{O} \end{array}$ wherein R ¹ = a linear or branched C _{>1} alkyl group; and R ² and R ³ = a linear or branched C ₁₋₂₀ alkyl group. |

Summary of claim 9:

| | |
|---|--|
| A solid catalyst component for propylene-ethylene copolymerization obtained by reacting the following compounds (a), (b) and (c); or (a), (b), (c) and (d): | |
| a | a magnesium compound; |
| b | a titanium compound; |
| c | an electron-donating compound represented by the following general formula (II): and $\begin{array}{c} \text{R}^4 \\ \\ \text{R}^2-\text{O}-\text{C}-\text{C}-\text{C}-\text{O}-\text{R}^3 \\ \quad \quad \\ \text{O} \quad \text{R}^5 \quad \text{O} \end{array}$ wherein R ² and R ³ = a linear or branched C ₁₋₂₀ alkyl group; R ⁴ = a linear, branched or cyclic C ₁₋₂₀ alkyl group; R ⁵ = H or C ₁₋₂ alkyl group; <i>R⁴ and R⁵ may be bound together to form a ring</i> |
| d | a silicon compound |

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 5-9, 13, and 15-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Kioka et al. (US 5,055,528).

The following rejection is applied to the case where

a solid catalyst component for olefin polymerization obtained by reacting the following compounds (i), (ii) and (iv)" or

a solid catalyst component for propylene-ethylene copolymerization obtained by reacting the following compounds (a), (b) and (c)"

Kioka et al. disclose a catalyst system to produce a propylene polymer [copolymer of propylene and ethylene], comprising (A) a solid titanium catalyst component; (B) an organoaluminum compound; and (C) an organic silicon compound, a solid titanium catalyst component comprising magnesium, titanium, halogen , and a polycarboxylic acid ester as essential ingredients, which is obtained by the contact of a magnesium compound, a titanium compound, and the polycarboxylic acid ester, wherein **the titanium compound** is represented in the general formula of $Ti(OR)_9X_{4-9}$

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which can be TiCl_4 , TiBr_4 , or TiI_4 ; **the magnesium compound** can be alkoxy magnesium halide such as ethoxy magnesium chloride, isopropoxy magnesium chloride, butoxy magnesium chloride, or octoxy magnesium chloride, which reads on “an alkoxy-containing magnesium compound obtained by reacting metal magnesium, an alcohol and a halogen”; **the polycarboxylic acid ester** can be dibutyl methyldmalonate, diethyl ethylmalonate, diethyl isopropylmalonate, diethyl butylmalonate, diethyl diethylmalonate, diethyl diisobutylmalonate, diethyl di-n-butylmalonate [col. 4, lines 56-68; col.5, lines 1-28; col.6, lines 23-26 and 51-61; Example 1 (copolymer of propylene and ethylene); claim 1]. Thus, the present claims are anticipated by the disclosure of Kioka et al.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-3, 5-13, and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kioka et al. (US 5,055,528) in view of Yukimasa et al. (US 6,423,782 B1).

The following rejection is applied to the case where

a solid catalyst component for olefin polymerization obtained by reacting the following compounds (i), (ii), (iii) and (iv) or

a solid catalyst component for propylene-ethylene copolymerization obtained by reacting the following compounds (a), (b), (c) and (d)

The disclosure of Kioka et al. is adequately set forth in paragraph 8 and is incorporated herein by reference.

The difference between the present claims and the disclosure of Kioka et al. is the requirement of a halogen-containing silicon compound to be used in the solid titanium catalyst component.

Yukimasa et al. disclose a catalyst for propylene polymerization, comprising (A) a solid catalyst component obtained by the contact of a magnesium compound, a titanium compound, and an electron donor compound; (B) an organoaluminum compound, and (C) an organosilicon compound, wherein the magnesium compound is $Mg R^4 R^5$ with R^4 and R^5 each representing a hydrocarbon group, OR^6 , or a halogen atom, which can be butoxymagnesium chloride, ethoxymagnesium bromide, or ethoxymagnesium iodide; the titanium compound is $TiX^1_p(OR^8)_{4-p}$, which can be titanium tetrachloride; the electron donor compound is polycarboxylate; the silicon compound is $Si(OR^3)_m X^1_{4-m}$, which is preferably silicon tetrachloride (col. 7, lines 49-67; col. 8, lines 1-41; col. 9, lines 1-24, 44-62; col. 10, lines 20-56; claim 1). Yukimasa et al. further disclose that the magnesium compound is obtained by the contact of metal magnesium with a halogen and an alcohol, wherein the halogen includes iodine,

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chlorine, bromine, and fluorine and iodine is preferred; the alcohol includes methanol, ethanol, propanol, butanol, or octanol (col. 8, lines 29-32). Yukimasa et al. furthermore disclose that the contact of the magnesium compound and the electron donor compound with the titanium compound is carried on at 125°C and the resulting product is washed with dewatered octane at 125°C [Examples 1-5 (col. 21, lines 19-36)].

Yukimasa et al. also disclose that "[t]he silicon compound improves the catalyst activity and the stereospecificity of the catalyst, and will reduce the fine powder content of the polymer produced in the presence of the catalyst" [motivation] (col. 10, lines 30-33). It is noted that Kioka et al. are silent on the use of the halogen-containing silicon compound in the solid titanium catalyst component. However, Kioka et al. do recognize that "[a]nother electron may be present in the titanium catalyst component" (col. 6, lines 1-2). In light of such benefits, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the silic compound disclosed by Yukimasa et al. in the solid titanium component of Kioka et al. and thereby obtain the present claims.

11. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kioka et al. (US 5,055,528) in view of Yukimasa et al. (US 6,423,782 B1) as applied to claims 1-3, 5-13, and 15-16 above, and further in view of Yuya et al. (JP 06-122716).

The disclosure of Kioka et al. in view of Yukimasa et al. is adequately set forth in paragraph 10 and is incorporated herein by reference.

The difference between the present claim and the disclosure of Kioka et al. in

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view of Yukimasa et al. is the requirement of dibutyl cyclobutane-1,1-dicarboxylate to be used in the solid titanium component.

Yuya et al. disclose a catalyst comprising a solid catalyst component, an organic aluminium compound, and a compound having an Si-O-C bond, wherein the solid catalyst component comprises an alicyclic diester which is exemplified in [0017] (abstract). Yuya et al. further disclose that the resulting catalyst comprising the alicyclic diester leads to a higher stereoregularity in polymer [*motivation*] ([0005]). Thus, Yuya et al. generically disclose dibutyl cyclobutane-1,1-dicarboxylate. In light of such benefit, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use dibutyl cyclobutane-1,1-dicarboxylate in the disclosure of Kioka et al. and thereby obtain the present invention.

Conclusion

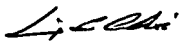
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling-Siu Choi whose telephone number is 571-272-1098.

If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reach on 571-272-1114.

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LING-SUI CHOI
PRIMARY EXAMINER

April 25, 2007